

THE RADIATION CARCINOGENESIS SPECIALIZED CENTER OF RESEARCHR.L. Ullrich¹, M.M. Weil², M. Story³, Y. Yu⁴, G. Vargas⁵, C. Nilsson⁶, M.R. Emmett⁷

¹University of Texas Medical Branch at Galveston, ²Colorado State University, ³University of Texas Southwestern, Medical School, ⁴University of Texas Medical Branch at Galveston, ⁵University of Texas Medical Branch at Galveston, ⁶ University of Texas Medical Branch at Galveston, ⁷ University of Texas Medical Branch at Galveston

ABSTRACT

The Radiation Carcinogenesis NSCOR consists of four projects supported by three cores. Project 1 involves determination of dose response relationships for the induction of acute myeloid leukemia (AML) and hepatocellular carcinoma (HCC) in C3H mice following irradiation with 350 MeV ²⁸Si ions, 600 MeV ⁵⁶Fe ions, 1 GeV ⁵⁶Fe ions, ¹³⁷Cs y-rays, or protons (acute and low dose rate exposures mimicking the 1972 Solar Particle Event). Project 2 is focused on developing a biological model for radiation-induced murine acute myeloid leukemia development and determining the effect of radiation dose and quality on each leukemogenic step. Project 3 is examining the pathogenesis of radiation-induced hepatocellular carcinoma testing the hypothesis that the striking differences observed in the dose responses following ¹³⁷Cs y-rays and 1 GeV ⁵⁶Fe irradiation reflect both quantitative as well as qualitative differences in high LET effects. The overall goal of Project 4 is to develop a cytogenetic and molecular profile of human radiation-induced AML, and to elucidate the key events and genetic pathways involved in the pathogenesis of this disease.

In this presentation we will summarize some of the recent findings from these projects. The most current data on AML and HCC dose response relationships in HZE, protons, and y-ray irradiated mice will be presented. Novel results on mechanisms of AML. Data will also be presented on qualitative differences in effects of HZE irradiation with respect to the neoplastic processes involved in the pathogenesis HCC including alterations in the microenvironment as well as effects on malignancy.